

REMARKS

Applicants respectfully request reconsideration and allowance of the present application based on the foregoing amendments and following remarks. By this amendment, claims 10, 18 and 25 have been amended and claims 2-9, 12-14, 20-22, 27-29 and 35-44 have been canceled. Upon entry of this amendment, claims 10, 15-19, 23-26, 30, 31 and 34 will remain pending in the application.

The amendments to the claims correct informalities and/or reduce issues for Appeal. They do not raise any new issues requiring further search and/or consideration. Accordingly, entry of the amendments is required under Rule 116.

Claim Rejections under 35 USC § 112, first paragraph

Claims 7, 8, 10 and 18-44 under 35 USC 112, first paragraph as failing to comply with the written description requirement. For reasons set forth below, Applicants respectfully request that the rejections be withdrawn.

Claim 7

Claim 7 and related dependent claims 8, 35-38 have been canceled, rendering this basis for the rejections moot.

Claims 10, 18, 25 – “identifying a plurality of grid points” and “determining an average height”

The Office Action notes that these claims recite “retrieving an initial height of the receiver based on the identified reference location,” “identifying a plurality of grid points located a predetermined distance from the reference location,” and “determining an average height of the receiver based on elevation information associated with the plurality of grid points.” The Office Action asserts that these limitations are not supported by the original disclosure and thus are new matter.

The limitations regarding the initial height of the receiver have been canceled from claims 10, 18 and 25, as well as all dependent claims therefrom, thus rendering this basis for the rejection moot and further reducing issues for Appeal. Accordingly, these amendments should be entered under Rule 116.

As for the remaining limitations, Applicants respectfully disagree with the basis for the rejections.

In one example description of this claimed subject matter, the specification teaches an example of identifying a reference location, a plurality of grid points and determining an average height at paragraph 79 as follows:

In FIG. 5, a flow chart 500 of the steps for determining location with a SATPS receiver with digital terrain elevation data is shown. The SATPS receiver 102 starts 502 by receiving three SATPS satellite spread spectrum signal 116, 118 and 120 and digital terrain elevation data from digital terrain elevation data memory 262 in server 250. Upon a reference location being determined, the orthometric heights at points 1 km apart in the easting and northing direction are retrieved with the reference location at the center 504. A total of $(2xN+1)^2$ points are considered on a grid of $(2xN+1)x(2xN+1)$ points. The orthometric "H" coordinates are converted to WGS 84 "h". The average "h" is determined and the "h" error equal to absolute value of the difference between the average "h" and the maximum or minimum "h" (whichever is the greater).

Those skilled in the art will further understand from the above disclosures that the "predetermined distance" of the grid points refers to the notion that in some embodiments of the invention, the points are separated by a same distance (e.g. 1km) from each other, and thus from the reference location. Moreover, as can be seen from the example above, the elevation information at the grid points includes the database information at the grid points, such as the orthometric "H" coordinates.

Accordingly, it is respectfully submitted that the claimed subject matter is fully supported by the specification as originally filed and that the § 112 (first paragraph) rejections of the claims should be withdrawn.

Claims 10, 18, 25 – “determining an average error value”

The Office Action notes that these claims recite “determining an average error value based on the elevation information associated with the plurality of grid points and the average height of the receiver.” The Office Action asserts that these limitations are not supported by the original disclosure and thus are new matter.

More particularly, the Office Action states that paragraph 024 of the specification calls for an error in the fixed height h , but not an average error value. However, Applicants respectfully submit that the specification as filed fully supports the claimed subject matter.

For example, as shown above, paragraph 79 of the specification teaches:

In FIG. 5, a flow chart 500 of the steps for determining location with a SATPS receiver with digital terrain elevation data is shown. The SATPS receiver 102 starts 502 by receiving three SATPS satellite spread spectrum signal 116, 118 and 120 and digital terrain elevation data from digital terrain elevation data memory 262 in server 250. Upon a reference location being determined, the orthometric heights at points 1 km apart in the easting and northing direction are retrieved with the reference location at the center 504. A total of $(2xN+1)^2$ points are considered on a grid of $(2xN+1)x(2xN+1)$ points. The orthometric "H" coordinates are converted to WGS 84 "h". The average "h" is determined and the "h" error equal to absolute value of the difference between the average "h" and the maximum or minimum "h" (whichever is the greater).

Those skilled in the art will understand from the above disclosures teach one example of an "average error value" that is equal to an absolute value of the difference between the average height " h " and the minimum or maximum height of the SATPS receiver. So contrary to the Office Action, the specification does not limit the invention to computing an error in a "fixed height" of the receiver.

Accordingly, it is respectfully submitted that the claimed subject matter is fully supported by the specification as originally filed and that the § 112 (first paragraph) rejections of the claims should be withdrawn.

Claim Rejections under 35 USC § 112, second paragraph

Claims 7, 8, 10-31, and 34-44 stand rejected under 35 USC 112, second paragraph as being indefinite. Claims 7, 8, 12-14, 20-22, 27-29 and 35-44 have been canceled, rendering the rejection of these claims moot. For reasons set forth below, Applicants respectfully request that the rejections of the remaining claims be withdrawn.

Claims 19 and 26

The Office Action states that it is not clear what is set forth in the claim limitations “a maximum height of a satellite position receiver” or “a minimum height of a satellite position receiver.” Applicants respectfully disagree and submit that the claims are clear to those skilled in the art in view of the claims as a whole and the specification.

For example, the claims clearly recite that the maximum and minimum height are used to determine the claimed “average height”. Claims 18 and 25, from which claims 19 and 26 respectively depend, clearly recite that the average height is determined “based on the elevation information associated with the plurality of grid points.” So the maximum and minimum heights are also clearly associated the elevation information associated with the plurality of grid points. This is also clear from the descriptions in the specification as a whole, including for example the passage from paragraph 79 reproduced above.

Accordingly, Applicants respectfully submit that the claimed subject matter is clear to those skilled in the art and that this basis for the rejections should be withdrawn.

Claims 10, 18, 25, 34

The Office Action states that it is not clear what is set forth in the claim limitations “an initial height,” “average height,” and “average height error.” More particularly, the Office Action state that “it is not clear what height applicant is referring to. Is it the height of a satellite from the earth, the height of a mountain?” Applicants respectfully disagree and submit that the claims are clear to those skilled in the art in view of the claims as a whole and the specification.

First, in all instances where the term “height” is used, the claims clearly recite that the “height” is “of the satellite positioning receiver.” So there is no basis for the Office Action’s statement that one skilled in the art could wonder whether the claimed height was of “a satellite from the earth” or “a mountain.” Clearly, the claimed height refers to the height of the satellite positioning receiver.

Second, the claimed height is further associated in the claims with “elevation data” that is associated with the grid points, and this claimed subject matter is abundantly clear from the specification as a whole, including how the elevation data is retrieved from a database, with indices based on the grid points.

Accordingly, Applicants respectfully request that this rejection be withdrawn.

Claim 25

The Office Action states that claim 25 recites a means plus function limitation, but that “Applicant does not identify the claimed means.” Applicants respectfully disagree with the basis for this rejection. Claim 25 clearly recites that it is directed to a “machine-implemented method” and further delineates the method steps performed in the claimed method. Indeed, the claim does not even include the term “means.” Accordingly, there are unquestionably no means plus function limitations in the claim under § 112, sixth paragraph, and this basis for the § 112 rejection of claim 25 should be withdrawn.

Claim Rejections under 35 USC § 103

Claims 2-9, and 34-44 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Ptasiński et al., Journal of Navigation, 2002, chapter 55, pp. 451-462 (“Ptasiński”) in view of U.S. Patent No. 6,202,023 to Hancock (“Hancock”). Claims 2-9 and 35-44 have been canceled, rendering the rejections thereof moot. Applicants respectfully traverse the rejection of the remaining independent claim 34 as set forth below.

Applicants restate and incorporate herein by reference their previous remarks regarding this rejection. To the extent possible, the following remarks will focus on new points raised in the Final Office Action.

Independent claim 34 recites, inter alia:

a horizontal error ellipse parameter in an altitude equation that forms an error ellipse having a major axis and a minor axis that corresponds to an altitude error about the initial height of the receiver;

a plurality of points along the major axis and the minor axis that form a grid of grid points that the controller accesses the digital terrain elevation data in memory at the grid points; and

a two-dimensional polynomial surface fit over the grid points.

The Final Office Action relies on Ptasiński for disclosing the claimed subject matter that is underscored above. Hancock is only relied upon for the claimed polynomial surface fit.

Applicants respectfully submit that Ptasiński, even if one skilled in the art would combine it with Hancock as alleged, does not disclose or suggest the invention as a whole as set forth clearly in the claims.

Ptasiński merely teaches that WGS-84 uses an ellipsoidal model of the Earth, which is used in GPS positioning. Ptasiński further notes that location errors can be introduced when spherical approximations are used together with the ellipsoid model, for example in altitude aiding applications where a pseudosatellite is located at the center of the Earth. Ptasiński then introduces equations and a methodology for estimating a position based on pseudoranges and altitude data from a digital map data-set that allegedly overcome these approximation errors.

However, nowhere does Ptasiński teach or suggest the invention as explicitly set forth in independent claim 34.

First, independent claim 34 clearly requires forming an error ellipse . . . that corresponds to an altitude error about the initial height of the receiver. Just because Ptasiński notes that an ellipsoid model of the Earth is used by WGS-84 does not mean it teaches or suggests forming such an error ellipse. Ptasiński does use the words “ellipsoid” and “error”. However, Ptasiński does not combine these words into a teaching of an invention of forming an error ellipse . . . that corresponds to an altitude error about the initial height of the receiver. Those skilled in the art would not confuse an ellipsoid model of the Earth, as described in Ptasiński, to an error ellipse having a major axis and a minor axis that corresponds to an altitude error about the initial height of the receiver as required by the clear limitations of the claims. Nor would the skilled artisan be led to determine such an ellipse merely because Ptasiński also discloses errors in altitude estimation using spherical-based altitude aiding data.

Next, independent claim 34 clearly requires a plurality of points along the major axis and the minor axis that form a grid of grid points that the controller accesses the digital terrain elevation data in memory at the grid points. Ptasiński discloses altitude aiding data, but it does not teach or suggest accessing data from memory at grid points as clearly required by independent claim 34. The Final Office Action points to Figures 1 and 2 of Ptasiński, which show ellipses and points. However, one skilled in the art would not be taught anything from these Figures about how to access data in a memory using these points, much less a plurality of

points along the major axis and the minor axis [of an error ellipse] that form a grid of grid points that the controller accesses the digital terrain elevation data in memory at the grid points.

The Final Office Action further states that “to compute a GPS position on the surface of the earth, Ptasinski notices that an error occur due to the earth not being a sphere and thus compares the difference between the points on the ellipsoid and the sphere to obtain an approximate error between the positions on the ellipse and positions on the sphere.” (Action at 18.) This stretches Ptasinski’s teachings unreasonably out of proportion. Ptasinski merely notes that inaccuracies will occur between locations computed based on an ellipsoid model of the Earth and locations based on a spherical model. Ptasinski does not teach or suggest forming “points” (emphasis on plural) on either a sphere or an ellipsoid, much less a grid of points along a major and minor axis of an ellipse as required by the claims. Rather, Ptasinski just computes an error between an altitude based on an ellipsoid and spherical model. This does not teach or suggest the invention clearly set forth in claim 34 as a whole.

For at least these reasons, therefore, Applicants respectfully submit that independent claim 34 patentably distinguishes over Ptasinski in combination with Hancock.

Claim Rejections under 35 USC § 102

Claims 10 and 12-31 stand rejected under 35 U.S.C. 102(b) as being anticipated by Ptasinski. Claims 12-14, 20-22 and 27-29 have been canceled, rendering the rejections thereof moot. Applicants respectfully traverse the rejections of the remaining claims, as set forth below.

Independent claim 10 recites (with similar subject matter in independent claims 18 and 25), *inter alia*:

identifying a plurality of grid points located a predetermined distance from the reference location;

determining an average height of the receiver based on elevation information associated with the plurality of grid points;

determining an average height error value based on the elevation information associated with the plurality of grid points and the average height of the receiver;

deriving at least three simultaneous equations associated with the at least three positioning signals;

solving the at least three simultaneous equations with the average height of the receiver and the average height error value that results in a position and a corresponding horizontal error ellipse;

fitting a two-dimensional polynomial to the corresponding horizontal error ellipse; and

solving the at least three simultaneous equations and the two-dimensional polynomial that results in an altitude of the satellite positioning receiver.

Applicants restate and incorporate herein the previous remarks against this rejection. To the extent possible, Applicants' remarks below will focus on new issues raised in the Final Office Action.

As set forth above in connection with independent claim 34, Ptasinski merely teaches that WGS-84 uses an ellipsoidal model of the Earth, which is used in GPS positioning, and introduces equations and a methodology for estimating a position based on pseudoranges and altitude data from a digital map data-set. However, nowhere does Ptasinski teach or suggest identifying a plurality of grid points and determining an average height and average height error using elevation information associated with the grid points as required by independent claim 10.

Based on these facts, Applicants' previous response demonstrated that Ptasinski did not teach the subject matter as clearly set forth in the claims, specifically the subject matter set forth above.

The Final Office Action mainly responds that these limitations are not supported by the original disclosure, and apparently cannot be relied upon as distinguishing features. However, as Applicants have shown above in connection with the § 112 rejections of the claims, these limitations are clearly supported by the original disclosure.

The Final Office Action further states that "Ptasinski (figs. 5-10) mentions a digital map, well known to show a grid of grid of points [sic] (since digital is made of grids)." (Action at 17.) Applicants respectfully submit that this is insufficient support for a rejection under § 102. Just because Ptaskinski mentions a map does not mean that Ptasinski teaches identifying a plurality of grid points located a predetermined distance from the reference location; determining an average height of the receiver based on elevation information associated with the plurality of grid points; [and] determining an average height error value based on the elevation information associated with the plurality of grid points and the average height of the receiver as clearly required by the independent claims. Simply put, those skilled in the art would not be taught how to identify a plurality of grid points and determine an average height and average height error using elevation information associated with the grid points based on Ptasinkski's disclosure of a "digital map".

Independent claims 18 and 25 recite limitations similar to those in independent claim 10. Accordingly, Applicants respectfully submit that independent claims 18 and 25 distinguish over Ptasinski for reasons similar to those set forth above with respect to independent claim 10.

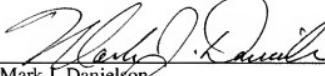
Claims 12-17 and 37-38 depend from independent claim 10, as amended. Claims 19-24, 39 and 40 depend from independent claim 18, as amended. Claims 26-31, 41 and 42 depend from independent claim 25, as amended. Accordingly, Applicants respectfully submit that claims 12-17, 19-24, 26-31, and 37-42 distinguish over Ptasinski for the same reasons set forth above with respect to independent claims 10, 18 and 25, as amended, respectively.

Conclusion

All objections and rejections having been addressed, it is believed that the claims are in condition for allowance, and Notice to that effect is earnestly solicited. If any issues remain which the Examiner feels may be resolved through a telephone interview, s/he is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,
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